US-PAT-NO: 5077665
DOCUMENT-IDENTIFIER: US 5077665 A

TITLE: Distributed matching system

DATE-ISSUED: December 31, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Reuters Limited				GB2	03

APPL-NO: 07/ 357036 [PALM]
DATE FILED: May 25, 1989

INT-CL: [05] G06F 15/20

US-CL-ISSUED: 364/408; 364/401
US-CL-CURRENT: 705/37

FIELD-OF-SEARCH: 364/408, 364/401, 364/514

PRIOR-ART-DISCLOSED:

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Search Selected | Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
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3581072	May 1971	Nymeyer	235/152
4412287	October 1983	Braddock, III	364/408
4674044	June 1987	Kalmus et al.	364/408
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4745559	May 1988	Willis et al.	364/514
4750135	June 1988	Boilen et al.	364/514
4868866	September 1989	Williams, Jr.	380/49

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
1489571	October 1977	GB	364/408
1489573	October 1977	GB	364/408

ART-UNIT: 236

PRIMARY-EXAMINER: Smith; Jerry

ASSISTANT-EXAMINER: Cass; Russell E.

ABSTRACT:

A matching system for trading instruments is provided in which bids are automatically matched against offers for given trading instruments for automatically providing matching transactions in order to complete trades for the given trading instruments in which controllable subsets (110, 112) of a distributable system trading book (118) may be selectively provided to trading keystations (24) in the matching system from the host computer (20) or central system for dynamically controllably masking the available trading market. The system comprises the host computer (20) for maintaining a host book data base (118) comprising all of the active bids and offers in the system by trading instrument, a transaction originating keystation (24a) at a client site (26) for providing a bid on a given trading instrument to the system for providing a potential matching transaction, a counterparty keystation (24b) for providing an offer on the given trading instrument involved in the potential matching transaction, and a network (22) for interconnecting the host computer (20), the transaction originating keystation (24a) and the counterparty keystation (24b) in the system for enabling data communication therebetween. Both the transaction originating keystation (24a) and the counterparty keystation (24b) each have an associated local data base keystation book (110, 112) comprising a subset of the host book (118). The content of each of the keystation books (110, 112) has an associated display depth range which is dynamically controllable by the host computer (20) and is dynamically updatable by transaction update broadcast messages (132) received from the host computer (20) through the network (22) which is preferably transparent to the transactions communicated.

57 Claims, 18 Drawing figures

DOCUMENT-IDENTIFIER: US 5077665 A
TITLE: Distributed matching system

US PATENT NO. (1):
5077665

Brief Summary Text (4):
The present invention relates to matching systems for effectuating trades of trading
instruments through automatic matching in which buyers and sellers who are willing
to trade with one another based on specified criteria may automatically trade when
matching events occur satisfying these criteria, and more particularly to such
matching systems in which the book of bids and offers may be distributed under
control of the central system or host computer, to the participating keystations or
client sites in the system.

Brief Summary Text (7):
In the system of the present invention, as opposed to the prior art known to
applicants, the central system maintains a data base consisting of all of the
trading instruments available for trade, credit information, and the bids and offers
that are present throughout the system, while the client sites or keystations
maintain copies of only the best bids and offers and use those to generate a
display. Thus, the client sites have some restricted subset of the total depth of
the system book located at the central data base. By transmitting only subsets of
the total system book from the host, the amount of network overhead that is required
is significantly reduced, which reduction is further enhanced by the use of only
summary information in the keystation books. Moreover, this enables the central data
base maintaining a full set of information for every entry including identification
of the parties which identification is not to be provided for the subset books at
the keystations in an anonymous trading system. The only time that the keystation is
made aware of the parties involved in the transaction is after the transaction has
been completed. Thus, in the system of the present invention, the host may enforce a
structure on the client site data bases which is the maximum depth of displayable
queue or display depth for a particular trading instrument. By a single parameter
change at the host or central system, the view of the trading instrument throughout
the entire matching system "world" can be effectively changed. For example, if the
host system sets the display depth equal to one, then none of the keystations would
be able to look further into the book. If desired, this procedure can be dynamically
varied from the host so that at given times or given days different aspects of the
trading environment can be displayed. Although, dynamic control of the content of a
local receiver data base from a transmitted data base in an information retrieval
communication network has been previously employed by applicants assignee such as
disclosed in U.S. Pat. Nos. 4,745,559 and 4,750,135, these systems are different
from the type of system control employed in the system of the present invention in
which restricted subsets of the host book are maintained as summary books at the
keystation local data bases. Thus, the system of the present invention for providing
a distributed matching system overcomes the disadvantages of the prior art.

Detailed Description Text (2):
Referring now to to drawings in detail and initially to FIG. 1 thereof, the system
of the present invention is a distributed anonymous matching system for use in
trading various trading instruments, such as different foreign exchange currencies.
In the system of the present invention as described herein, the trading is
effectuated through anonymous matching as opposed to through the conversation video
system described in U.S. Pat. Nos. 4,531,184; 4,525,779; and 4,404,551, commonly
owned by applicants' assignee herein. Thus, the distributed matching system of the

present invention may be thought of as a computerized exchange in which its central role is to _identify_ a buyer and a _seller_ who are willing to trade with one another based on specified criteria, such as price, quantity and credit. When such a _matching_ event occurs, preferably the buyer and _seller_ are informed of the trade and sufficient information is then provided to them to complete the physical clearing of the transaction. In order to support this central function, the matching system requires various support functions one of which is preferably the maintenance of summary market information on the participant's workstation or keystation displays at the various client sites. Preferably in the system of the present invention, at all times the system will display the best inside price for every instrument traded on the system. The best inside price is preferably defined to be the highest value bid and the lowest value offer in the system. Preferably the prices are displayed together with the quantity bid or offered at the specified price so that the trader at the keystation can observe the market activity.

Detailed Description Text (4):
Referring now to FIG. 2, this figure illustrates a typical data flow in accordance with the system of the present invention for entry of a bid or entry of an offer, with the network 22 being omitted since, as was previously mentioned, it is transparent to transactional information. First discussing the enter bid event in accordance with the system of the present invention, keystation 1 or 24a, submits a bid transaction to the central system 20. The directed message or directed response 32 which it receives back from the central system or host 20 is termed a bid acknowledgment or BID-ACK. This acknowledgment is a command acknowledgment which is preferably followed by an entry position message and is as was previously mentioned, is directed directly back to the keystation 24a. In addition, as shown and preferred in FIG. 2, a bid update message is broadcast by the central station 20 to all keystations in the system, such as represented by reference numeral 34a in FIG.2. This broadcast message 34a preferably occurs if this new bid 32a was the new best bid in the system, or was an additional quantity being bid at the best price in the system. Thus, if this new bid 32a is at the highest price or better or higher, then it will result in a bid update broadcast message 34a going out throughout the system. In addition, as also shown by way of example in FIG. 2, if it is desired to disseminate an external ticker 60, then the ticker information 60 will also be provided of the best bid or best offer. Preferably, the same procedure is followed with respect to entry of an offer with the messages, in this instance, being _identified_ as offer, given reference numeral 51, offer acknowledgment or OFFER-ACK, given reference numeral 32b, and the broadcast message for offer update, being given reference numeral 34b.

Detailed Description Text (5):
Referring now to FIG. 3, the data flow in accordance with the present invention is illustrated with respect to a situation in which there is a hit bid resulting in a trade. In this situation, there is substantially more activity than in the situation previously described with reference to FIG. 2. Thus, as shown and preferred in FIG. 3, if keystation 24b submits a transaction called "hit bid", represented by reference numeral 62, to the central station or host 20, a hit acknowledgment or HIT-ACK, represented by reference numeral 64, is provided back to keystation 24b as a directed message. At that point, the central system 20 will recognize that a match is possible because the "hit bid" message says that keystation 24b is willing to trade at the bid price. Assuming that credit is OK and does not play a role beyond that in this transaction, the central system 20 determines that a match is possible put, preferably, before committing to the match, it may get involved in a risk limiting protocol using a transaction desk 70 which determines whether the trade is possible, and if so, acknowledges this to the central system 20. Assuming that a trade is possible, then a match occurs. At that point several messages are generated from the central system 20. One of these messages is termed the match message, given reference numeral 65, which is a directed message that goes to the bidder, which in this instance is keystation 24b, and to the keystation 24a which originally owned the bid. Thus, in this instance, directed messages go to more than one keystation 24. Preferably, every _match_ must be acknowledged so there is a _match_ acknowledgment message, MATCH-ACK which comes back from the buyer and _seller_ keystations 24b and 24a and is used to determine that the_match_ was in fact received correctly and that the deal can be considered complete at that point. In addition, a broadcast message is generated that a trade has occurred which trade update message, given reference numeral 67, may possibly cause a new best bid to occur or could affect the quantity or price at the top of the book. Again, if the trades and best bids go into the ticker 60, then this information is provided to the ticker as well. Similarly, if clearing information is provided to a clearing house, this too occurs as represented

by reference numeral 69. In addition, as shown and preferred, trade tickets may also be generated. Thus, trade ticket information is also preferably provided to the participating keystations 24a and 24b so that the trade tickets can be generated.

Detailed Description Text (6):
Referring now to FIGS. 4 and 5, illustrations of typical books employed in the distributed matching system of the present invention are shown, with FIG. 4 illustrating a typical book at the central system 20 and FIG. 5 illustrating a typical keystation book at a typical keystation such as keystation 24a, based on the book of FIG. 4. The central station or host book illustrated in FIG. 4 is a logical model of the book market pre-posting and is divided into a bid side and an offer side. Each box in the diagram preferably stands for an entry into the side of the market. The value in the upper left hand corner of the box represents the price of the trading instrument and the value in the lower right hand corner represents the primary quantity of the trading instrument. As further shown and preferred in FIGS. 4 and 5, on the bid side the highest absolute value is at the top of the book and the lowest absolute value is at the bottom of the book, whereas on the offer side the worst relative offer value is at the top of the book and the best relative offer value is at the bottom of the book. In addition the time order of bids and offers goes from left to right with, on the bid side, the last bid being left most and the first bid being right most, whereas on the offer side, the first offer is left most and the last offer is right most. This convention is also followed in connection with the keystation book of FIG. 5 which is a subset of the system or central station or host book of FIG. 4. Thus, as can be seen in FIG. 5, the keystation books located at the client sites 26 maintain copies of the best bids and offers contained in the host book of FIG. 4 and use that information to generate displays at the keystations 24. In addition, as was previously mentioned, the display depth of the keystation book is controlled by the host computer 20. For example, in FIG. 5, a display depth of 3 is illustrated on the bid side and the offer side. It is this display depth which helps restrict the subset of the total depth of the book contained at the host computer or central system 20. In reality, there are two controls on the display depth, one is a central control by the host computer 20 which determines the maximum possible display depth for the keystation book, and the keystation 24 itself which, within that maximum parameter, can further limit the display depth of the book. Of course, the host computer also restricts the subset of the host book by limiting other information such as by withholding the identities of the parties until the transaction is completed and such other things as net together prices, and net together quantities. It should be noted that in the illustrative example of FIGS. 4 and 5, bids and offers of equal goodness are drawn on the same order down the line. The central system book maintained by the host contains detailed information from each client site on the particulars of each bid or offer. Preferably each bid and offer is identified with a token to give it a unique handle by which it can be referred to in future transactions and is time-stamped based on entry into the system. As further shown and preferred in FIG. 5, the keystation book is a summary book which contains accumulated summaries of bids at the same price and offers at the same price. Thus, by way of example, block 71 in FIG. 4 is a summary of blocks 73, 75 and 77 in FIG. 4, which shows a total quantity of 10 at the price of 138.86,, and block 80 is a summary of blocks 82 and 84 in FIG. 4 which shows a total quantity of 14 at the price 138.38. Similarly, on the offer side, block 86 is a summary of blocks 88 and 90 in FIG. 4, showing a total quantity of 9 at an offer price of 139.9, and block 92 is a summary of blocks of 94, 96 and 98, showing a total quantity of 13 at an offer price of 139.70. It should be noted that with respect to the offer side of FIG. 5, since the display depth is only three, the fourth worst offer represented by block 100 in FIG. 4 does not appear in the keystation book of FIG. 5 since it is outside the designated display depth range.

Detailed Description Text (7):
With respect to the user entry record maintained at the central database 20, preferably such items as the bidder offer indicator, the instrument ID number, the quote, the quantity, the time-stamp, the keystation transaction number, the host transaction number, etc. are maintained. If desired, different trading instruments may be quoted in different ways. For example, you may have some trading instruments quoted on the basis of absolute price and others on the basis of yield or discount, and so on. In addition, clearing information may be stored at the central system 20. As was previously mentioned, this type of information fully qualifies the entry to the host computer or central system 20 which can perform matching based on the collection of bids and offers that it has at any particular point in time, whereas the client site or keystation 24 preferably maintains copies of only some of these fields so that it can create displays. Thus, the host or central system 20 reduces

the amount of network overhead that is required by transmitting only summary information about the book and typically restricts the price depths that are sent down, such as the depth of three given in the example of FIG. 5. In addition, as previously mentioned above, the host will aggregate quantities at the same price level as illustrated in FIG. 5. In allocating the accumulated summary to a match, the rules generally followed are that it goes by price, time of entry to the system, and by credit.

Detailed Description Text (8):
Now we shall briefly discuss the IXM update message structure for broadcast messages. IXM as used herein is another name for the book or an instrument crossed with a market. The book maintenance protocol or operation block protocol is preferably a way for instructing the client sites 26 to add, drop or remove particular sub-books from their associated book displays. Preferably, the host 20 enforces a structure on the client site data base which is a queue of prices whose maximum display depth is that display depth that the host enforces for that particular instrument. The IXM update message is a broadcast message which preferably contains a number of fields, such as the identifying information for the trading instrument that is being effected by this updated message, with the information being tokenized in order to minimize the bandwidth used on the network. Thus, very short numbers are used to indicate things like the trading instrument or the user or the subscriber that the system is trying to affect. In this instance, the IXM update message instructs the client site 26 to update the information being maintained in a particular instrument and contains an IXM token. As shown and preferred in FIGS. 7 and 8, the IXM update message contains a number of fields for providing the requisite summary information, such as the number of highs, lows, trades, etc., which information is used to key into the rest of the message. Preferably IXM updates are cummulative and apply to the then current state of the book maintained at the client site 26. Thus, the IXM update preferably contains new information about an IXM and the state in context of the instruments book. The message is preferably of variable length and may or may not contain certain information blocks. The IXM sequence number field preferably represents a number of updates to an IXM. The keystation 24 uses this value to preferably ensure that it receives all updates to an IXM and that it does not apply an outdated update. The block list size preferably defines how many information blocks are required for the IXM. Preferably the size of the operations list may exceed the maximum size of the message. In such an instance, the IXM is segmented across multiple messages. The number of highs specifies that a high quote is being sent, which typically would be only a one or zero. Similarly the number of lows specifics that a low quote is being sent, which would typically only be a one or a zero. The number of trades preferably specifies the length of the trade list for the message which is used for the last trade statistic as well as for support of the ticker. Typically the IXM image would only have, at most, a single trade block to indicate the last trade if there was one. The number of operations preferably specifies the length of the operation list for the message. If the block list size does not equal the sum of the number of highs, number of lows, number of trades, and number of operations, the IXM has been segmented across multiple messages. At least one IXM segment message will then preferably follow. When the sum of all the number of highs, lows, trades and operations fields across the segmented messages equal the block list size, then preferably the IXM data set is complete.

Detailed Description Text (13):
In the situation when a trade occurs, this means that a matching offer is present in the system, the host system 20 has accepted that matching offer, and sends back the acknowledgment command, in effect retrieving the existing book on Yen, in the above example, finds out that there is ten million Yen at 127 in the book, adds to that the newly entered fifteen million at 127, and is aware that it has positioned fifteen million at 127. The host 20 then does the match up including that ten million and does the trade, taking out the existing bid, so it reduces that amount to zero million at 127 leaving over five million at 127 on the offer side. In this instance, as will be explained with reference to FIG. 6, at least two directed messages have been sent, actually four having been transmitted to the client sites 26 that are involved in the trade. The seller will get an indication that his Yen bid has traded by means of a match notification and he will, thereafter, be informed who the counterparty was after the match has been made. The clearing and settlement of the trade will then preferably be the responsibility of the subscribers. The counterparty who originally transmitted the offer and entry position message saying that it had a Yen offer Positioned greater than the bid will then get an entry positioned Yen offer at five million at 127 and will get a match notification saying

that, with respect to his offer, ten million of his original fifteen million has traded with the party who will then be identified Lastly, the IXM update broadcast message will be constructed and broadcast to all client sites 26 to update the trading book. That update message will preferably, in the above example, contain two operation blocks, one which will remove the bid information from the client book and the second which will post the new five million offer which remains on the offer side and will show that a trade took place. In addition, as was previously mentioned, if desired, ticker information will also be provided in the IXM update message saying what traded, keeping track of the cummulative volume, the net change, the number of changes, the high limits, the low limits and so forth. It should be noted that preferably only the keystation 24 that either executed the transaction or was involved somehow in that transaction will receive the directed message with respect thereto and not other keystations 24 at the same client site 26, whereas with respect to broadcast messages all keystations 24 at all client sites 26 receive these messages. If desired, with respect to credit, which does not form part of the present invention herein, this can be controlled on a client site 26 by client site 26 basis as opposed to a keystation 24 basis. Thus, in the system of the present invention, the network 22 has two functions, one of which is directed message delivery and the other of which is broadcast message delivery.

Detailed Description Text (19):
Referring once again to FIG. 17 and 18, matching is only attempted, preferably, when the posting function indicates that the best bid value is better than or equal to the best offer value. The matching function is preferably the same for both book markets and auction markets. In a book market, it is possible for any order to cross the market; that is, for a new bid to be higher than the best offer or a new offer to be lower than the best bid. In this case, trades are preferably allowable at multiple quotes filling the order starting at the best quote and working down to the quote specified in the new order as necessary to trade as much quantity as possible. Since the quote depth for an auction market is only 1, just the bid side and the offer side of a market are submitted to matching. If one or more matches are found, the following information is preferably given for each matching pair; namely, the buyer, the seller, the instrument, the quantity traded and the quote. As is shown by way of example in FIG. 17, there is a bid which has been introduced at the value of 139.19, a value that betters the current best bid. Since there exists no sub-book on this price on the bid side of the book, a new one is created. At this point, the best bid value is equal to the best offer value so the bid and offer sub-books with the value of 139.19 are submitted to the matching function. Both of the offer entries are fully traded for a trade total quantity of nine. The bid is only partially traded and a quantity of one remains. It should be noted that with respect to FIG. 4, there are seven sub-books in the market, three on the bid side and four on the offer side with a value spread between the bid side and the offer side of the market currently existing so that no matching could take place at that time. FIG. 18 illustrates the logical model of the book market after the trade is over. In this instance the offer sub-book with a value of 139.19 in the above example has no more entries in it so the sub-book is removed. There is a bid remaining at that quantity so it remains in the sub-book. A new value spread now exists in the book.

End of Result Set

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L14: Entry 3 of 3   File: USPT   Nov 7, 1995

US-PAT-NO: 5465291
DOCUMENT-IDENTIFIER: US 5465291 A

TITLE: Apparatus for ordering from remote locations

DATE-ISSUED: November 7, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Holly; Krisztina	Woodland Hills	CA	91367	
Cassidy; Michael	Patomac	MD	20854	

APPL-NO: 08/ 369583   [PALM]
DATE FILED: January 6, 1995

PARENT-CASE:
This is a continuation of application Ser. No. 08/080,584 filed Jun. 24, 1993, which
is a continuation of application Ser. No. 07/685,843 filed Apr. 16, 1991, both now
abandoned.

INT-CL: [06] H04 M 1/64

US-CL-ISSUED: 379/67; 379/91, 379/97, 379/102, 235/381, 235/375
US-CL-CURRENT: 379/67.1; 235/375, 235/381, 379/91.01, 379/93.26

FIELD-OF-SEARCH: 379/67, 379/88, 379/91, 379/97, 379/102, 379/104, 235/381, 235/375,
235/462, 364/401, 364/412

PRIOR-ART-DISCLOSED:

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ART-UNIT: 261

PRIMARY-EXAMINER: Hofsass; Jeffery A.

ASSISTANT-EXAMINER: Tsang; Fan

ABSTRACT:

The present invention relates to an improved interactive store or other central location-remote telephone home, office or other user telephone terminal system and technique for enabling users to order items from the central location with the aid of machine-readable apparatus at the user terminal, preferably a bar code reader, operated by the user in scanning pre-prepared bar codes descriptive of the items to be ordered, and the signals of which are directly converted to DTMF tones transmitted over the telephone to the central location where they are recognized and stored, with voice confirmation describing the ordered item automatically sent back over the telephone to the user.

8 Claims, 11 Drawing figures

L14: Entry 3 of 3   File: USPT   Nov 7, 1995

DOCUMENT-IDENTIFIER: US 5465291 A
TITLE: Apparatus for ordering from remote locations

US PATENT NO. (1):
5465291

Brief Summary Text (4):
Recently, Sears and IBM have teamed up to create software, called "Prodigy", that allows people using a home computer to connect with a database maintained by several types of stores, including grocery stores and airlines, to determine what items are available and at what price. If interested, the users can then place an order with that store and have the item delivered, having the cost of that item charged to their credit cards.

L14: Entry 1 of 3   File: USPT   Oct 26, 1999

US-PAT-NO: 5974396
DOCUMENT-IDENTIFIER: US 5974396 A

TITLE: Method and system for gathering and analyzing consumer purchasing information based on product and consumer clustering relationships

DATE-ISSUED: October 26, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Anderson; Michael W.	West Seneca	NY		
Hargreaves; David	North Tonawanda	NY		
Hoellig; Susan M.	Boston	NY		
Johnson; Drew S.	Wexford	PA		
Mischel; Blaine D.	Buffalo	NY		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Moore Business Forms, Inc.	Grand Island	NY			02

APPL-NO: 08/ 683906   [PALM]
DATE FILED: July 19, 1996

PARENT-CASE:
This is a continuation of application Ser. No. 08/021,105, filed Feb. 23, 1993, now abandoned.

INT-CL: [06] G06 F 17/60

US-CL-ISSUED: 705/10; 705/14
US-CL-CURRENT: 705/10; 705/14

FIELD-OF-SEARCH: 705/14, 705/1, 705/7, 705/10, 705/16, 235/375, 235/383, 235/380, 235/381, 186/35, 186/52, 186/59, 186/61

PRIOR-ART-DISCLOSED:

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Insider, vol. 2, #10, 1990.
Insider, vol. II, No. 21, Oct. 1990.
"Exploring Some Issues In Frequent Shopper Programs", Supermarket Business, Sep.

1989, pp. 13-15, 236.
Las Margaritas promotional brochure, 1989.
"Getting To Know Your Customers", Retail & Distribution Management, Jul./Aug. 1989-90.
"Frequent Shopper Plan Was Born In Charleston", The News & Courier/The Evening Post, May 2, 1990.

ART-UNIT: 271

PRIMARY-EXAMINER: Weinhardt; Robert A.

ABSTRACT:

A method and system for gathering and analyzing customer and purchasing information permits a retailer or retail chain to process transactional information involving large numbers of consumers and consumer products. Product information is gathered that uniquely identifies a specific product by type and manufacturer and grouped into generic product clusters. Consumers are similarly grouped into consumer clusters based on common consumer demographics and other characteristics. Consumer retail transactions are analyzed in terms of product and/or consumer clusters to determine relationships between the consumers and the products. Product, consumer, and transactional data are maintained in a relational database. Targeting of specific consumers with marketing and other promotional literature is based on consumer buying habits, needs, demographics, etc. A retailer queries the database using selected criteria, accumulates data from the database in response to that query, and makes prudent business and marketing decisions based on that response. Queried information from the database may be communicated to a printing subsystem for printing promotional literature directed to particular customers based on cluster information stored in the database.

42 Claims, 20 Drawing figures

L14: Entry 1 of 3   File: USPT   Oct 26, 1999

DOCUMENT-IDENTIFIER: US 5974396 A
TITLE: Method and system for gathering and analyzing consumer purchasing information
based on product and consumer clustering relationships

<u>US PATENT NO.</u> (1):
<u>5974396</u>

<u>Brief Summary Text</u> (6):
Increased sales and customer loyalty may be obtained by offering a reward system.
For example, the <u>airline</u> industry rewards loyal customers using frequent flyer
programs. Attempts have been made to develop "frequent shopper" marketing and sales
promotion services in retail sales. Some retail grocery chains, for example, provide
coupons based upon consumer purchase amounts accumulated during a particular
shopping transaction. Coupons tend to be for arbitrary goods which are not directed
to any particular needs or interests of the specific consumer.

☐ | Generate Collection | | Print |

L12: Entry 2 of 2   File: USPT   Oct 25, 1983

US-PAT-NO: <u>4412287</u>
DOCUMENT-IDENTIFIER: US 4412287 A

TITLE: Automated stock exchange

DATE-ISSUED: October 25, 1983

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Braddock, III; Walter D.	Springfield	IL	62707	

APPL-NO: 06/ 418297   [PALM]
DATE FILED: September 15, 1982

PARENT-CASE:
This application is a continuation application of Ser. No. 581,840, filed May 29, 1975 and now abandoned.

INT-CL: [03] G06F 15/20, G06F 15/24

US-CL-ISSUED: 364/408; 364/200, 364/300
US-CL-CURRENT: <u>705/37</u>

FIELD-OF-SEARCH: 364/200, 364/300, 364/408, 364/900

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

| Search Selected | | Search ALL |

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	<u>3259886</u>	July 1966	Singer et al.	364/200
☐	<u>3378820</u>	April 1968	Smith	364/200
☐	<u>3573747</u>	April 1971	Adams et al.	364/200 X
☐	<u>3581072</u>	May 1971	Nymeyer	364/408 X
☐	<u>3848233</u>	November 1974	Lotan et al.	364/200

ART-UNIT: 237

PRIMARY-EXAMINER: Gruber; Felix D.

ABSTRACT:

An automated stock exchange in which a computer matches buy and sell orders for a plurality of stocks. An open board simultaneous trading environment is simulated through two stages. The first stage is an order accumulation period which is continuously in operation except for one stock in the second stage. The second stage is an extremely rapid sequential call through. All orders for a given stock are available to customers during the first stage. During the second stage market orders are matched with market orders, then market orders are traded against limit orders as the trading price changes within controlled ranges. The system will also process stop orders, and other specialized transactions.

1 Claims, 6 Drawing figures

End of Result Set

L12: Entry 2 of 2   File: USPT   Oct 25, 1983

DOCUMENT-IDENTIFIER: US 4412287 A
TITLE: Automated stock exchange

US PATENT NO. (1):
4412287

Brief Summary Text (31):
The member brokers send their orders for trades on all stocks to their agent on the exchange, the floor broker takes these orders to the trading post for that stock. At the post a trader or specialist in one or more stocks accepts orders. The specialist may match the new order with a prior order and act as an agent for buyer and seller, receiving a commission from both. Alternatively, the specialist may enter the trade as a principal, negotiating to buy or sell the stock. In some cases, two parties at a post may consummate a trade independently of the trader or specialist.

Brief Summary Text (47):
The Nymeyer system includes a central computer and remote terminals for each of the brokers utilizing the system. The brokers submit orders which identify the stock, the size of the order, whether it is to buy or sell, and whether it is a price (limit) or a market order.

Detailed Description Text (146):
The files containing the market orders are initially positioned. Cancel market, cancel stop and cancel stop limit commands are read into array D until the scratch file containing the commands is exhausted. The unexecuted market buy orders are then read from the market files until these are exhausted. The arguments of the cancel market buy command are checked against the arguments of all unexecuted market buy orders. The transaction number, the limit or stop price, and the broker and customer identification numbers must be the same. In an actual run, the stock ID would also be the same. Other information such as the time the system accepted the order would be submitted with the cancel instruction in a real time environment and would be very helpful in locating and cancelling the unexecuted order if it existed. The number of shares originally associated with the order would not be tested as the order could have partially executed. If a match between the order and the cancel is found, the computer prints out the order which has been cancelled. Unfound cancel instructions are returned to the scratch file and unfound order instructions are returned to the working file. Market sell commands on Rile 22 and cancel stop and stop limit sell commands on File 16 are processed identically.

Detailed Description Text (220):
The various hardware components are standard known I.B.M. equipment identified as central processing unit Model 3158; console printer, Model 3213, card reader Model 3505; card punch Model 3525; printer and control, Models 3811-3211; tape drives Model 3420; tape drive control unit Model 3803 and disk storage and control, Model 3333-3300.

Detailed Description Paragraph Table (8):
_____ DESCRIPTION OF INPUT RECORDS Column Name
Description _____ BROKER INSTRUCTIONS 1-8 ID The word order or the word cancel 9-15 A(1) Total number of shares involved in the order 16-22 A(2) Transaction 1=buy,2=sell,3=limit buy, 4=limit sell,5=stop buy,6=stop sell 7=stop limit buy 8=stop limit sell 9=instantaneous buy,10=instantan 23-29 A(3) limit or stop price if needed 30-36 A(4) Broker and customer ID 37-43 A(5) Stock ID 44-50 A(6) Actual price of transaction 51-57 A(7) Number of shares involved in the

transaction 58-64 A(8) Transaction number for this order 66-73 A(9) Limit price if a
stop limit REGULATOR'S DECISIONS 1-8 ID The word regulate 9-15 A(1) The new market
price 16-22 A(2) The maximum price change per transaction 23-29 A(3) The maximum
price change per cycle 30-36 A(4) Execute or do not execute stop orders 37-43 A(5)
Execute or do not execute this cycle 44-50 A(6) Max price on fluctuation if no trade
51-57 A(7) Min price on fluctuation if no trade 58-64 A(8) Increment if no trade
65-71 A(9) =0 if set up =1 if change in decisions 72-78 A(10) =DP change the
direction of price movement if no trade _____

Detailed Description Paragraph Table (9):
_____ __ DISPLAY
OF SAMPLE ERROR MESSAGES
_____ (1) Input
Record Stop Sell Without Stop Price "Possible error, limit on stop limit sell is
zero. Processing continues." 900.00 9.00 0.0 3.00 20.00 (shares) (tr type) (Br Cust)
(St ID) _____
DISPLAYS DISPLAY OF THE ORDER, CANCEL, AND REGULATE COMMANDS BEFORE EXECUTION Broker
Order Input Cancel Size Tr. Type L.P. or S.P. Br. Cust. St. Id. Tr. Pr. No. Sh. Tr.
No. LPif SL Regulator New Mkt Max. Chg. Max. Chg. No. Tr. No. Tr. No. Tr. No DP
Input Regulate Price Trans Cycle Ex. Stops Ex. Orders Chg. Max Chg. Min Inc. Chg
Chg. _____
regulate 48.00 3.00 5.00 0.0 0.0 55.00 43.00 2.00 1.00 order 900.00 2.00 0.0 3.00
20.00 0.0 0.0 0.0 0.0 order 400.00 2.00 0.0 3.00 20.00 0.0 0.0 0.0 0.0 order 600.00
9.00 0.0 3.00 20.00 0.0 0.0 0.0 0.0 order 100.00 4.00 51.00 3.00 20.00 0.0 0.0 0.0
0.0 order 100.00 8.00 48.50 3.00 20.00 0.0 0.0 0.0 48.25 order 100.00 7.00 49.00
3.00 20.00 0.0 0.0 0.0 49.50 order 100.00 7.00 49.00 3.00 20.00 0.0 0.0 0.0 54.00
order 100.00 8.00 45.00 3.00 20.00 0.0 0.0 0.0 0.0 cancel 100.00 8.00 45.00 3.00
20.00 0.0 0.0 0.0 0.0 finish 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
_____ The
column headings are abbreviations of those set out in the first and second input
records above.

Detailed Description Paragraph Table (14):
_____ TABLE OF TESTS Element Element Number
Description Test _____ 1 Number of shares Must be
greater than zero but less than 1,000 (This value has been set only for purposes of
this routine to detect errors) 2 Type of transaction Must be greater than zero but
less than 11. 3 Limit or stop price If the type of transaction is 1, 2, 9 or 10, a
market or instantaneous order; this value must be zero. 3 Limit or stop price If the
type of transaction is 3 through 8, this value must not be zero. 3 Limit or stop
price Where valid, this value must be between a range of half to twice the current
market price. If the book's become very large this range may be narrowed to control
the numbers of orders stored. 4 Broker ID. Both the broker and the Customer ID
customer must be identified 5 Stock ID The stock must be identified All All numbers
must be less than 10,000. [At this point the cancel command has been completely
processed and control returns to IREAD, if an order command is being processed.] 9,
3 Stop limit buy price Stop limit buy must be greater stop buy price than the stop
buy price 9, 3 Stop limit sell price Stop limit sell price must be stop sell price
less than the stop sell price 9 Stop limit sell This price should not be zero 4
Customer_ID Must be between 1 and 10 for comparison with the accounts processed by
the back end. 4 Customer ID The customer may not have been defined previously by the
back end. 4 Customer ID Customer may have neither enough stock nor enough money in
his account at the present time. _____

CLAIMS:

1. The method of operating a computer to process data records containing information
about transactions in fungible goods, such as securities, which are produced by a
data input device and generating an output display comprising the steps of:

(a) storing in a designated area all data records relating to each security,

(b) processing the data records relating to a first security in sequence in
accordance with the following steps,

(c) sorting the data records into a first subset, each containing information
including a customer identifier, an offer to buy, an associated price, and the
number of shares of the security, hereinafter limit buy orders, in a priority
sequence beginning with the highest price,

(d) sorting the data records into a second subset, each containing information including a customer identifier, an offer to sell, an associated price, and the number of shares of the security, hereinafter limit sell orders, in a priority sequence beginning with the lowest price,

(e) sorting the data records into a third subset, each containing information including a customer identifier, an offer to buy at the market, and an order time, hereinafter market buy order, in a priority sequence beginning with the earliest time,

(f) sorting the data records into a fourth subset, each containing information including a customer identifier, an offer to sell at the market, and an order time, hereinafter market sell orders, in a priority sequence beginning with the earliest time,

(g) sorting the data records into a fifth subset, each containing information including a customer identifier, an offer to buy at the market above a certain or stop buy price, hereinafter stop buy orders, into a priority sequence beginning with the lowest stop buy price,

(h) sorting the data into a sixth subset, each containing information including a customer identifier, an offer to sell at the market below a certain or stop sell price, hereinafter stop sell orders, into a priority sequence beginning with the highest stop sell price,

(i) storing within said designated area, in a seventh subset, a data record containing the price of the latest transaction of said security, hereinafter the last trade price,

(j) comparing each data record in said first subset with the record in said seventh subset to identify those records having a limit buy price above the last trade price,

(k) comparing each data record in said second subset with the record in said seventh subset to identify those records having a limit sell price below the last trade price,

(l) processing each such identified data record in said first subset in priority sequence against such identified records in said second subset at the last trade price, until the identified records of one subset are exhausted,

(m) merging said processed records into new records stored in an eighth subset of data records relating to said security, said records containing a puchaser identifier, a seller identifier, a transaction price and an identifier for the number of shares in the transaction,

(n) comparing each data record in said fifth and sixth subsets with said data record in said seventh subset to determine the stop buy orders at or below the last trade price and the stop sell orders at or above the last trade price and moving each such record to the end of the third and fourth subsets of data records,

(o) comparing each of the data records in said first and second subsets to identify either limit buy orders at or above the last trade price or limit sell orders at or below the last trade price,

(p) merging said identified records of limit order from said first or second subsets of data against opposed records of market orders at the last trade price and adding said new records to said eighth subset of data records, until the identified records in said first or second subset are exhausted,

(q) merging the records of market orders from said third and fourth subsets of data at the last trade price and adding said records to said eighth subset of data records, until the identified records in said third or fourth subset are exhausted,

(r) merging the remaining records of market orders from the unexhausted third or fourth subset of data against the records, in sequence of the records of limit orders of the second or first subset of data at the limit price until one of such subsets of records are exhausted,

(s) comparing each such record added to the eighth subset with the record in the seventh subset to update the value of the last trade, according to the result of the comparison,

(t) transferring control to process the data records relating to the next security.